UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,475	09/01/2006	Mitsuo Takashima	295882US0X PCT	1462

22850 7590 06/04/2010

OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER	
SHEVIN, MARK L	
ART UNIT	**PAPER NUMBER**
1793	

NOTIFICATION DATE	DELIVERY MODE
06/04/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No.	Applicant(s)	
	10/591,475	TAKASHIMA ET AL.	
	Examiner	Art Unit	
	MARK L. SHEVIN	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 March 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. Claims 1-18, filed March 8th, 2010, are currently under examination. Claims 1 and 15 have been amended.

Status of Previous Rejections

2. The previous rejections of claims 1-18 under 35 U.S.C. 103(a) in the Office action dated December 8th, 2009 over **Namimura** (JP 2000-337334 – Full human translation now provided) in view of any one of **Koike** (US 2002/0179207 A1), **Hijikata** (JP 59-226116 – Full human translation now provided), or **Stefayne** (US 3,677,829) have been maintained.

Claim Objections

3. **Claim 12** is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim, or amend the claim to place the claim in proper dependent form, or rewrite the claim in independent form.

The amendment to claim 1 narrowing the Si content to 1 to 3 wt% now causes claim 12 to have the identical Si range of 1 to 3 wt%, thus claim 12 does not further limit claim 1.

Claim Rejections - 35 USC § 103

4. **Claims 1-18** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Namimura** (JP 2000-337334 – Machine translation) in view of any one of **Koike** (US 2002/0179207 A1), **Hijikata** (JP 59-226116 – Derwent abstract and oral translation of cited portion), or **Stefayne** (US 3,677,829).

Namimura

Namimura, drawn (Abstract) to a high-strength bolt with excellent resistance to delayed fracture and a tensile strength of over 1200 N/mm^2, features a microstructure of more than 80 area% pearlite with the remainder being proeutectoid ferrite, free cementite, bainite, and martensite at less than 20 area% (para 0012).

The contents of C (para 0016), Si (para 0018), Mn (para 0021), P (para 0029), S (para 0030), Al (para 0025), Cr (para 0020), Co (para 0019), Ni (para 0023), Cu (para 0022), Mo+V+Nb+Ti+W (para 0024), B (para 0026), and Fe (para 0028) are shown in the comparative table below:

Elements	Namimura	Instant Claims 1,15	Overlap
C	0.5 – 1.0	0.5 – 1	0.5 – 1
Si	(0) – 2.0	1 – 3	1 – 2.0
Mn	0.2 – 1.0	0.2 – 2	0.2 – 1.0
P	(0) – 0.03	(0) – 0.03	(0) – 0.03
S	(0) – 0.03	(0) – 0.03	(0) – 0.03
Al	0.01 – 0.05	(0) – 0.03	0.01 – 0.03
Cr	(0) – 1.0	0.51 – 2.5	0.51 – 1.0

Co	(0) – 0.5	(0) – 0.5	(0) – 0.5
Ni	(0) – 1.0	(0) – 1.0	(0) – 1.0
Cu	(0) – 0.5	(0) – 1.0	(0) – 0.5
Mo, V, Nb, Ti, W	Total: 0.01 – 0.5	Total: (0) – 0.50	Total: 0.01 – 0.5
B	0.0005 – 0.003	(0) – 0.003	0.0005 – 0.003
Fe	Balance	Balance	Balance

The bolt is formed by wire drawing, cutting to a predetermined length, warm-forging the head, and rolling the threads (para 0006-0007). Warm forging is used instead of cold forging because it is more difficult to form the bolt head by cold forging due to the very high strength of the wire rod (para 0040).

Namimura does not teach subjecting the bolt to a bluing treating in a temperature range of 100 to 500°C.

Koike:

Koike, like Namimura, is drawn to a high-strength bolt having excellent delayed fracture resistance and stress relaxation resistance with a tensile strength of over 1200 N/mm^2 (Abstract), teaches producing a steel wire of the composition listed in the table below, with a total areal rate of pro-eutectoid ferrite, pro-eutectoid cementite, bainite, and martensite of less than 20% with the remainder as pearlite (para 0008).

Elements	Koike	Namimura	Overlap
C	0.5 - 1	0.5 – 1.0	0.5 – 1.0
Si	0 < 0.5	(0) – 2.0	(0) – 0.5

Mn	0.2 – 1.0	0.2 – 1.0	0.2 – 1.0
P	0 < 0.03	(0) – 0.03	(0) – 0.03
S	0 < 0.03	(0) – 0.03	(0) – 0.03
Al	0.01 – 0.05	0.01 – 0.05	0.01 – 0.05
Cr	0 - 0.5	(0) – 1.0	0 – 0.5
Co	0 < 0.5	(0) – 0.5	0 – 0.5
Ni	0 < 1.0	(0) – 1.0	0 – 1.0
Cu	0 < 0.5	(0) – 0.5	0 – 0.5
Mo, V, Nb, Ti, W	0 - 0.3	Total: 0.01 – 0.5	0.01 – 0.3
B	Not stated	0.0005 – 0.003	n/a
Fe	Balance	Balance	Balance

The steel wire is formed into a bolt by wire-drawing the steel (para 0015), cold heading the wire into a bolt shape (para 0021) and then bluing in the range of 100 – 400 °C to increase the bolt strength and improve the proof stress ratio and relaxation resistance (para 0020).

Koike does not teach the content of silicon in the claimed range of 0.55 – 3 wt% but does teach that the beneficial effects of Si (improving hardenability, deoxidation, and solid-solution strengthening) all improve with increasing Si content, but at the expense of ductility (para 0026). Koike and Namimura teach Si as a valuable element in terms of increasing mechanical properties but differ only what they consider as the maximum level acceptable for ductility purposes.

Hijikata:

Hijikata, like Namimura, is drawn to a high tension bolt (tensile strength above approximately 1275 N/mm^2 and thus within the range of Namimura) with resistance to delayed fracture (Title), discloses a bolt made from a low-alloy steel rod of C: 0.3 – 0.6 wt% and more than 1.2 wt% of Si as essential components that is blueing-treated (Abstract) at 300 – 350 °C (p. 9, para 3) to ensure that the strength of the threads to be equal to that of the flat parts to obtain a stronger bolt.

Stefayne:

Stefayne, drawn to a process for the bluing of steel surfaces, teaches that steel surfaces are blued to form a blue-colored oxide surface and to impart corrosion resistance (col. 1, lines 25-37). Bluing is performed between 305 and 360 °C (col. 2, lines 35-45). Claim 1 discloses forming colored oxides on steel surfaces by allowing the part to be blued to come in contact with the hot vapors. The part to be blued is in thermal equilibrium with the reflux vapors and is thus in the temperature range of 305 and 360 °C (col. 4, lines 70-75).

Regarding claims 1 and 15, Namimura discloses a high-strength bolt with a tensile strength in the claimed range, excellent resistance to delayed fracture resistance, having a base steel composition overlapping each and every claimed range of C, Si, Mn, P, S, Al, Cr, Co, Ni, Cu, Mo, V, Nb, Ti, W, and Fe, and having a microstructure with greater than 80 area% pearlite and remainder (< 20 area% pro-eutectoid ferrite, free cementite, bainite, and martensite).

It would have been obvious to one of ordinary skill in high-strength bolt production, at the time of the invention, to subject Namimura's bolt to a bluing treatment in the claimed range of 100 – 500°C as Koike taught that bluing in the overlapping range of 100 - 400 °C increases the strength, proof stress ratio, and relaxation resistance of the bolt (para 0020).

Alternatively, it would have been obvious to one of ordinary skill in high-strength bolt production, at the time of the invention, to subject Namimura's bolt to a bluing treatment in the claimed range of 100 – 500°C as Hijikata taught that bluing treatment at 300 – 350 °C is applied as the last step in the production of a substantially similar high-strength bolt with a tensile strength of greater than 1200 N/mm^2 (Abstract and p. 4, col. 2, para 4).

Again, alternatively, it would have been obvious to one of ordinary skill in high-strength bolt production, at the time of the invention, to subject Namimura's bolt to a bluing treatment in the claimed range of 100 – 500°C as Stefayne taught that bluing imparts corrosion resistance (col. 1, lines 25-37) and a blue-colored oxide film and that the process may be performed with vapors at between 305 – 360 °C, thus overlapping the claimed temperature range

It would have been obvious to one of ordinary skill in high-strength bolt production, at the time of the invention, to select any portion of the claimed ranges of alloying composition, microstructure area percentages, and bluing temperature, including the claimed ranges, from the overlapping ranges disclosed in Namimura 9all but bluing temperature), Koike (bluing temperature), Hijakata (bluing temperature), and

Stefayne (bluing temperature) because these references find that the prior art bolts in the entire disclosed ranges have a suitable utility and the normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages."); *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969). From MPEP § 2144.05: In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

With respect to the bolt being "...prepared by: wire-drawing,...cold heading", although Namimura does not specifically teach that his bolt was formed by cold heading, determination of patentability is based on the product itself and does not depend on its method of production unless the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted).

Cold-heading does not impart any additional structure to the claims beyond the alloy composition and microstructure already present and thus the prior art of Namimura does not teach away from the claimed product and instead reads on the claimed product as explained above.

Once the examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. *In re Marosi,* 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983)

With respect to the amendment to claims 1 and 15 narrowing the Si content to 1 to 3 wt%, Namimura overlaps the claimed range as shown in the comparative table at p. 3-4 above.

With respect to "…bluing treatment is done"…to form a solid solution of Si in the ferrite", one of ordinary skill in the art would have reasonably expected the final product of the high-strength bolt to have a solid solution of Si in the ferrite as Namimura taught that Si dissolves in ferrite, thereby demonstrating remarkable solid-solution strengthening (para 0018).

Regarding claims 2-14 and 16-18, Namimura teaches steel compositions with alloying additions of Co, Ni, Cu, Mo, V, Nb, Ti, W, B, and Fe that fall in the instantly claimed ranges as shown in the comparative table above. It would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch and MPEP 2144.05, above.

With respect to the amendments to claim 14, as discussed above, Namimura still has an overlapping Cr content.

With respect to claim 13, Koike and Hijikata teach bluing at temperatures overlapping those of the instantly claimed range of 200 – 300 °C, while Stefayne teaches a temperature range of 305 – 360 °C, it is not clear how the instant claims have any different result as a result of the lower bluing temperature, as the patentability of the claims is based on the end product and it's structure, not the method of manufacturing.

Response to Applicant's Arguments:

5. Applicant's arguments filed March 8th, 2010 have been fully considered but they are not persuasive.

Applicants assert (p. 6, para 3) that Namimura's bolts are produced by warm forging and lack a bluing treatment and thus would not lead one of ordinary skill to the claimed bolts.

In response, With respect to the bolt being "…prepared by:,…cold heading", although Namimura does not specifically teach that his bolt was formed by cold heading, determination of patentability is based on the product itself and does not depend on its method of production unless the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different

process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted).

Cold-heading does not impart any additional structure to the claims beyond the alloy composition and microstructure already present and thus the prior art of Namimura does not teach away from the claimed product and instead reads on the claimed product as explained above, nor is there any evidence that cold heading would result different structure compared to warm forging in the claimed products.

Once the examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. *In re Marosi,* 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983)

Although Namimura does not teach bluing treatments, the instant rejections are based on Namimura rely on any of one of several secondary references to provide motivation for incorporating a bluing treatment into Namimura. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See MPEP 2145, Section IV and *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicants assert (p. 7, para 2) that Namimura and Koike (p. 8, para 2) disclosed that the pearlite area rate is preferably 100% and the Si content to be preferably less than 1% (Namimura, p. 7, para 3). In response, disclosed examples and preferred

embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. *In re Susi,* 440 F.2d 442, 169 USPQ 423 (CCPA 1971). – see MPEP 2123, section II.

Applicants assert (p. 7, para 3) that Koike teaches away from cold heading when Si content is greater than 0.5 wt%. In response, the question of whether Koike teaches away from cold forging is not relevant to the determination of patentability in the instant product claims because there is no evidence that warm forging vs. cold forging results in a different final microstructure.

Applicants assert (p. 8, para 3) that Koike teaches that from steel containing more than 0.5 wt% Cr.

In response, from MPEP 2143.01, Where the teachings of two or more prior art references conflict, the examiner must weigh the power of each reference to suggest solutions to one of ordinary skill in the art, considering the degree to which one reference might accurately discredit another. *In re Young*, 927 F.2d 588, 18 USPQ2d 1089 (Fed. Cir. 1991). Furthermore, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure (interpreted as meaning all ranges are in agreement) of the primary reference.... Rather, the test is what the combined teachings of those references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981) – MPEP 2145, III.

Namimura is used as the primary reference and has an overlapping range of Cr, preferably less than 0.5 wt% (para 0020), but differs from Koike in that it considers 1.0

wt% to be the maximum allowable content instead of 0.5 wt% as Koike does. Namimura and Koike are substantially similar invention in teaching high-strength bolts of substantially similar composition (see second comparative table on p. 4-5) and microstructure. Weighing the suggestive power of Namimura against Koike, Namimura is more suggestive in that it discloses a broader range of Cr and Si compared to Koike while Koike does not even have a coherent teaching away of a negative result upon addition of "too much" Cr. Koike only teaches that bolt strength increase upon addition of Cr and Co "cannot be improved any further" (para 0035).

Applicants assert (p. 9, para 1) that Namimura and Hijikata are not properly combinable because Hijikata has a different microstructure. In response, Hijikata is silent as to the precise microstructure constitution by area or volume percent but is used for the disclosure regarding bluing treatment as applied to, comparing Namimura and Hijikata, similar bolts for the purposes of creating a stronger bolt (p. 9, para 3).

Applicants assert (p. 9, para 2) that Hijikata teaches away from combination with Namimura because of divergent carbon contents in the two references. In response, Namimura discloses a carbon content of 0.5 – 1 as being suitable for bolt production (para 0016), while Hijikata discloses a carbon content of 0.3 to 0.6 wt% (p. 5, second to last paragraph). Both references have an overlapping carbon content as compared to the instantly claimed range of 0.5 – 1 wt%. Furthermore, where the teachings of two or more prior art references conflict, the examiner must weigh the power of each reference to suggest solutions to one of ordinary skill in the art, considering the degree to which one reference might accurately discredit another. *In re Young*, 927 F.2d 588, 18

USPQ2d 1089 (Fed. Cir. 1991), in this case, Hijikata merely states that C above 0.6 is unnecessary to retain a tensile strength of 150 kgf/mm2 or more, while Namimura is more persuasive because of its breadth and clarity of consequences when C is out of range -- stating (para 0016) that an increase in C leads to an increase in strength, with at least 0.5 wt% necessary for a strength of 1200 N/mm2 or more (122.4 kgf/mm2 or more) and that more than 1.0 wt% C leads to deterioration in toughness, ductility, and wire-drawing processability.

Applicants assert (p. 9, para 3) that Stefayne's bluing treatment is completely different from the instant bluing treatment as required by the instant product claims. In response, Applicants have not shown how the bluing treatments are, in fact, different and this assertion is not persuasive as Stefayne plainly discloses bluing as 305 - 360 °C, which is within the claimed bluing treatment temperature range. Furthermore, even if Stefayne's bluing treatment is different, Applicants would have to demonstrate a nonobvious, patentable distinction in the final products as a result of the different bluing treatment.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

-- Claims 1-18 are finally rejected
-- No claims are allowed

The rejections above rely on the references for all the teachings expressed in the texts of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588 and fax number is (571) 270-4588. The examiner can normally be reached on Monday - Friday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy M. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Mark L. Shevin/
Examiner, Art Unit 1793
May 26th, 2010
10-591,475

/George Wyszomierski/
Primary Examiner
Art Unit 1793